

# Sugar Making Is Utah's Greatest Industry; Eighteen Gigantic Factories Are Operated

SUGAR making is the greatest manufacturing industry of Utah. Eighteen gigantic plants in this state and others in the west are owned, controlled and operated by Utah companies. Upon their success depends not only the prosperity of those directly connected with the companies, but the farmers, the retailers, the bankers and practically all others of the intermountain states.

Of these eighteen plants in Utah, the Utah-Idaho Sugar company owns eight, the Amalgamated five and each belongs to the Layton, Springville, Mapleton, Gunnison, coples and Interstate sugar companies. Most of these factories are in northern Utah, those of Ogden and Hoober being in Weber county. In Box Elder county there are plants at Brigham and Garland. Davis county has one plant, at Layton. Four factories are operated in Cache county, these being at Logan, Lewiston, Cornish and near Smithfield. Salt Lake county has two plants, several are in Utah county with four in the southern part of the state—those at Delta, Gunnison, Moroni and Elsinore.

These eighteen mills have a combined daily cutting capacity of approximately 15,000 tons of beets.

**WHAT FACTORIES MEAN.**  
A factory run of 100 days is considered a satisfactory campaign. If all our Utah mills therefore were to be supplied with beets for a 100-day run, the farmers would have to supply 1,500,000 tons of sugar beets. Based on tonnage yield per acre of last year's sugar beet crop, which government statisticians calculated to be 11.20 tons per acre, which, by the way, was the highest tonnage of any state in the union, 134,000 acres of beets would have to be harvested.

This figure is not impossible of attainment, nor even improvable. Last year's acreage in Utah planted to sugar beets was 114,567. An additional acreage here of only about 21,500 would provide Utah's sugar mills with the beets necessary for a full capacity campaign.

The Utah sugar factories from 1,500,000 tons of beets could manufacture close to 400,000,000 pounds of sugar. At 6 cents a pound this would amount to \$24,000,000. The greater part of this amount is brought to this community from sugar sold in the east, is distributed here for labor for beets and general supplies.

**BIG AREA AVAILABLE.**  
There are thousands of acres available and suitable for sugar beet cultivation in Utah that have never yet been planted to beets. Farmers, however, are now aware of the benefits to the soil of sugar beets in a crop rotation and it is expected that very soon part of every one of Utah's farms, tributary to sugar factories, will produce its quota of Utah's "mortgage lifting" crop of sugar.

Farmers and bankers understand possibly better than any other class the real value of the beet sugar industry. Whenever a sugar factory is erected land values more than double. The by-products of the industry are also used to great advantage. Beet tops and the pulp are a particularly fine feed for cattle and sheep, either fresh, dry or as silage. Dried beet pulp produced by the Utah-Idaho Sugar company at its West Jordan mill is a favorite feed among dairymen for their cows. They claim that in a mixed diet a certain proportion of dried beet pulp accomplished results obtained through no other feed, and also that the production of milk is materially increased.

Sugar beet molasses, another by-product of the sugar industry, is also valued as cattle feed, especially for fattening and is fed by mixing with hay, pulp, etc. By utilizing these by-products in feeding livestock, the grower may receive a considerable profit other than obtained from the sale of the beets themselves. Furthermore, by plowing under the green beet tops as fertilizer, the land is kept in good condition as a large part of the fertility removed by the crop is returned to the soil.

**SURE MONEY IN FALL.**  
In the fall of each year business generally has come to look to the sugar beet money for relief. A year ago the Utah-Idaho Sugar company alone paid out \$15,000,000 for beets, labor and supplies for a three months campaign. In 1921, the amount was not so large because the price of beets was lower, but calculated on the tonnage, stated above as required to give all of Utah's factories a capacity run—that is, 1,500,000 tons—and at the present price prevailing in Utah, which is \$5.50 per ton, the amount paid for beets alone would be \$8,250,000.

If it were possible to follow every dollar of such a large sum of money which the farmers would receive every year and trace the uses to which it would be put as it circulated from farmer to the various people with whom he does business and from them in turn to all other business interests, it could be more fully realized what a great relief would be afforded each year.

Every effort should be made to keep the sugar mills of the state going full blast. It means much to every resident and more money for dis-

tribution among the farmers for beets, and among business men and other industrial enterprises for supplies.

**COMANIES SUFFER.**  
The year just passed has been disastrous for a considerable number of sugar companies. Many are in the hands of bankers' committees and bankers' committees and bankers can tell you of their serious financial condition. Had it not been for the action of the government in providing money to assist the beet sugar people, some factories would have been unable to begin operations last October.

Attention by congress on the pending tariff bill should provide ample tariff on foreign sugar. Any other action would invite further disaster to the domestic industry. It should be kept in mind that free sugar does not mean cheap sugar. A large percentage of the foreign grown cane sugar refined in the United States is sold in this country. The beet sugar industry here is of value to the refiners as well as to all consumers of sugar for it acts as a price stabilizer, and if anything should occur to put it out of business, this country would be at the complete mercy of the refiners and would soon be paying any price they

demanded for their sugar. But it is not anticipated that any such thing will occur. The industry has survived a very depressing year and immense losses have been sustained. The prospect is brighter for 1922. The sugar crop of 1921-1922 has been produced at a lower cost than that of a year ago. Adjustments of affairs generally have advanced very considerably and everyone has tried to "swallow" his losses. As far as sugar is concerned, present indications point to a revival in the industry by the end of this year, and experts are predicting a sugar shortage in 1923.

When compared to that of a discovery which would enable a country to feed double the number of people which could be fed before its utilization. Such a discovery was made a century ago and was heralded and utilized by the leading nations of Europe, with the result that their worn-out soils have been so rejuvenated that now they produce two bushels of grain where formerly they produced but one. But for the fact that Europe learned to rotate her cereal crops with a hoed root crop, and thereby doubled her acreage yield of cereals, European nations still would be encouraging and assisting emigration because of inability to feed their increasing population.

Strange as it may seem, this discovery has not been copied in the United States. With few exceptions, American writers on agricultural topics seem to have been totally oblivious both as to the cause and of the fact that the "worn-out soils of Europe" have been so built up that they now produce two bushels of grain where the virgin soils of the United States produce but one. In their ignorance, some American writers even advise farmers against adopting the very method which has revolutionized agriculture in Europe. And so it followed that American farmers have not profited by it, and their yields per acre remain practically stationary, while the crop yields of the balance of the world increase from year to year. During the past thirty years the combined average yield per acre of wheat, rye, barley and oats in the United States has increased but 6.4 per cent, while the average yield of the same crops in Germany has increased 80 per cent during the same period.

Experience in the United States and throughout Europe demonstrates conclusively that the introduction of a hoed root crop in the rotation one year in four is a prerequisite to heavy yields of cereal crops. Even though a farmer applies no science to his work save that of devoting his fields to a root crop one year in four, he will realize more from cereal crops than will the farmer who avails himself of all known scientific agricultural knowledge, but fails to introduce a hoed root crop in his cycle of rotation.

The opening of the Panama canal, the deepening of our inland waterways, the building of good roads, the establishment of a credit system whereby American farmers may secure loans at a low rate of interest, these and other projects are offered as solutions to the high cost of living problem, but it is obvious that important as these projects are, their combined influence would reduce the cost of living slightly in comparison to what it would be reduced if without additional expense our farmers were enabled to produce two bushels of grain where they now produce one.

While the writings of Cato and Pliny indicate that the art of root crop rotation was practiced 2000 years ago, Great Britain has the distinction of being the first country in modern times to introduce root culture in rotation with cereal crops as a means of increasing the yield of the latter. For a hundred years the basis of British agriculture was the turnip. In 1805, Thaeer, the English agriculturist, wrote a book on the subject of root crop rotation, with cereal crops, and as a result of his teachings and of those who followed him, British farmers increased their plantings of roots from year to year. They now grow 2,000,000 acres of hoed roots, principally turnips, in rotation, with 5,000,000 acres of cereal crops, which accounts for their heavy yield per acre. Their work was translated and placed in the hands of German farmers, and for many years German agricultural economists endeavored to induce them to adopt Thaeer's methods, but in vain. Two objections defeated all attempts in this direction. First, it required deep plowing, and deep plowing meant that a new crop of stones would be turned up each year to be hauled off the fields. Second, it meant the introduction of a crop that in itself

possessed but little money value, had to be fed instead of sold, and was even less profitable than the crops which these stones were growing. They declined to grow it.

**NAPOLÉON'S DISCOVERY.**  
A few years later, Napoleon's soldiers discovered the indirect value of sugar beets when growing in rotation with cereal crops, and on March 18, 1811, the French emperor dictated a note to his minister of the interior, instructing him to see that 90,000 acres of beets were planted in the different arrondissements the following season, and that the proper officials be appointed to enforce his command. He then appropriated 1,000,000 francs with which to establish schools of instruction and to be given in bonuses to those who erected factories. Although it was a new and unknown crop, the farmers were compelled to plant the beets. At the end of two years, 343 small French factories were producing 7,700,000 pounds of sugar, and by 1839 the French sugar product amounted to 40,000 tons, while that of Germany amounted to 1400 tons.

Observing that sugar beets in France revolutionized agriculture by increasing the yield of cereals to an even greater extent than had turnips in England, German economists used every effort to induce their farmers to follow the French plan. They concluded to follow the French plan, but to sell their sugar in foreign markets at a price below the cost of production, and still make a handsome profit. Immediately the German sugar industry began to expand and other European nations adopted similar industry, with the result that today one-half of the world's sugar supply is derived from European sugar beets.

**"THREE-CROP" SYSTEM.**  
When sugar beet culture was introduced into Europe, their farmers were practicing what is known as the "three-crop" system of rotation—three successive cereal crops, followed by one year of fallowing, the fallowing in order to rest the soil and enable it to produce the dense crop of weeds by hand. It is stated that in Germany approximately one-third of the total area of level land was regarded as being too poor to pay for cultivation, and their yield of cereal crops on the better land was but 12 bushels per acre.

They were plowing but three and four inches deep, using the heavy, springy, and the fertility of the thin layer of loose surface soil was all but exhausted. The grain roots were unable to penetrate the hard, soil underneath, and could they have done so, it would have been of no avail, for, containing no humus and not having been aerated, it was not fertile. Being a deep-rooter, a prerequisite to real sugar beet culture is that the soil be stirred to a depth of eight to fourteen inches.

The tender beetlet, having to undergo the shock of thinning as soon as it comes up, in order to leave only one beet in a place, demanded a well prepared, mellow seed bed. Gathering the sugar in its leaves from the atmosphere by the aid of the light and storing it up in the root, the sugar beet would not thrive if the light were cut off through being shaded by weeds and the eradication of the weeds before going to seed meant not only the stirring of the soil by cultivation and hoeing, but weedless fields for succeeding crops.

**ABSORPTION OF MOISTURE.**  
Being plowed out in the autumn gave an extra fall plowing, which left the land in condition to absorb instead of storing up the moisture for the following season's crops.

With the removal of the main root, myriads of fibrous roots were broken off and left in the soil to an estimated average of a ton to the acre, and in rotting, they not only deposited humus in the lower strata of soil, but they left minute channels through which it became aerated, and hence fertile. The roots of subsequent crops followed these interstices, drew nutriment from two or three times the depth of soil formerly reached, and hence the farmers doubled and trebled their soil without increasing their acreage.

**STOCK FEEDING HELPED.**  
Utilizing the by-products for stock feeding purposes greatly increased the stock carrying capacity of the farms, thereby furnishing a proportionate increase in the quantity of barnyard manure with which to build up the productivity of the worn-out soil. Although many American farmers still fail to recognize the value of barnyard manure and consider it a nuisance, inasmuch as the accumulations must be removed, scientists have yet to discover its equal as a fertilizer. The application of this increased quantity of the best fertilizer known, and of other fertilizers not only resulted in greatly increased tonnage of beets, but as the beets absorbed only a portion of the fertilizing elements, the balance was available for crops which followed during the succeeding three years.

The reason why the culture of sugar beets improves the soil to a greater extent than does the culture of other root crops is because their culture insures more liberal fertilization, deeper plowing and better cultivation than ordinarily is given to other root crops and because of the greater amount of fibrous roots which are left in the ground.

Farmers will engage in sugar beet culture in preference to the culture of other root crops because it is a cash money crop, while other root crops only can be fed to stock, and

## SUGAR BEET CULTURE IS IMPORTANT IN ROTATION WITH CEREAL CROPS

Until recently outside of scientific agricultural circles, it was a generally accepted conclusion in the United States that sugar beet culture injured the soil. Farmers so contended, and so universal was the contention that factory managements were compelled to concede that the farmers were right. Certain it was that after having been planted to beets several successive seasons, fields yielded a lower tonnage with each succeeding year.

While the department of agriculture pointed out many advantages of sugar beet culture and urged farmers to engage in it, various agricultural weeklies advised their readers that whatever might be the tonnage per acre and whatever the price of beets per ton, they could not afford to engage in beet culture, as if soon would destroy the productivity of their fields and ruin the value of their farms.

**FIRST DATA GIVEN.**  
Some ten years ago, I read in a country weekly the first detailed statement I had seen which purported to show in bushels per acre just how much sugar beet culture increased the yield of other crops when grown in rotation with them. The article gave with much particularity the result of a series of experiments which it was claimed had been conducted in Germany, and showed that sugar beet culture greatly improved the soil. Although unsigned, it bore evidence of sincerity, and I republished it in a short history of the beet sugar industry, only to be met with expressions of incredulity.

Feeling that we in the United States might have failed to discover the magnet which induced the nations of Europe to favor the beet sugar industry to a far greater extent than they favored other industries, I went there to study conditions first hand and to verify or disprove the statement contained in the country weekly above noted. I searched for reports of recent experiments on the subject, but was told there was none; that the facts had been definitely determined many years ago, and that there was no occasion for making such experiments now than to make a re-survey of the distance between Berlin and Vienna—both had been determined beyond question; even the trade press had ceased to give space to it; for decades every European agriculturist had recognized sugar beet culture as the father of modern scientific agriculture, the keynote of the arch.

**WHAT SEARCH REVEALED.**  
It thus became necessary to search for the works of earlier authors. In these works and in conversation with agricultural economists and sugar beet growers, I discovered the cause of all our trouble, the one reason why the experience of American sugar beet farmers gave contrary results to those obtained throughout the sugar beet districts of Europe. American farmers were growing beets on the same soil year after year, their only thought being "so many tons of beets per acre at so much per ton," whereas, since learning the indirect value of sugar beet culture, European farmers use them as a means to increase the yield of other crops rather than for their direct money value, and in order to spread the benefits over as great an area as possible they plant beets on the same soil but one year in three to five. From time to time this information since has been placed before the American sugar beet farmer, and now, by practical experience, many have learned of the value of sugar beet rotation and are enthusiastic over the results obtained.

If announcement were made that an Edison or a Burbank had discovered a means whereby each acre of the United States which is devoted to cereal crops could be made to yield two bushels where they now yield but one, regardless of any reasonable expense which might be involved, the discoverer would be greeted as the world's greatest public benefactor, the one who had solved the high cost of living.

**VERY VITAL DISCOVERY.**  
The value of the telephone, the electric light and many other important inventions make into insignificance

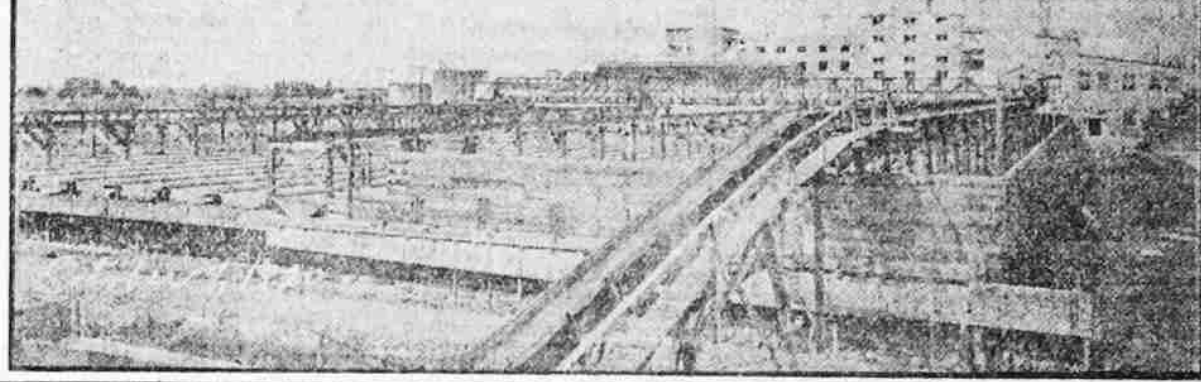
because after having been sold for the sugar contained in the beets, farmers haul back to their farms the by-products which contain all the elements extracted from the soil, and the feeding value is but slightly diminished by the extraction of the sugar.

**VALE OF ROOT CROPS.**  
The culture of sugar beets in Europe taught them the advantage of having a hoed root crop in the rotation, and now in the districts where there are no sugar factories, they raise sugar beets, mangels and turnips for stock feeding purposes, as do also the British farmers, but American farmers cannot be induced to grow a hoed root crop, except where a sugar factory is at hand to contract for the product at a high price.

As a result of sugar beet culture, the areas in Europe which formerly

were regarded as worthless have been brought under cultivation, thus greatly increasing the cultivated area, the three-crop system of rotation with one year of fallow has disappeared, and fields now yield four crops in four years instead of three crops in four years.

Where formerly only the better lands would yield 12 bushels of cereals three years in four, or nine bushels yearly per acre, now, with all the poor land added to the cultivated area, the worn-out and worthless soils have been so rejuvenated that the present combined average yield of wheat, rye, oats and barley in western Europe, including the yield of the less progressive states of the south, is 27.2 bushels per acre, while in Denmark it is 36.3, in Germany 39.4, in Holland 41.9 and in Belgium 51.9—000, an increase of \$3,900,000.



IMMENSE plant of the Amalgamated Sugar company, just west of Ogden, showing the facilities necessary for the handling of beets arriving at the plant. The gigantic structure is used entirely in the manufacture of beet sugar and is Ogden's largest industrial establishment, the second largest sugar factory in the intermountain states.

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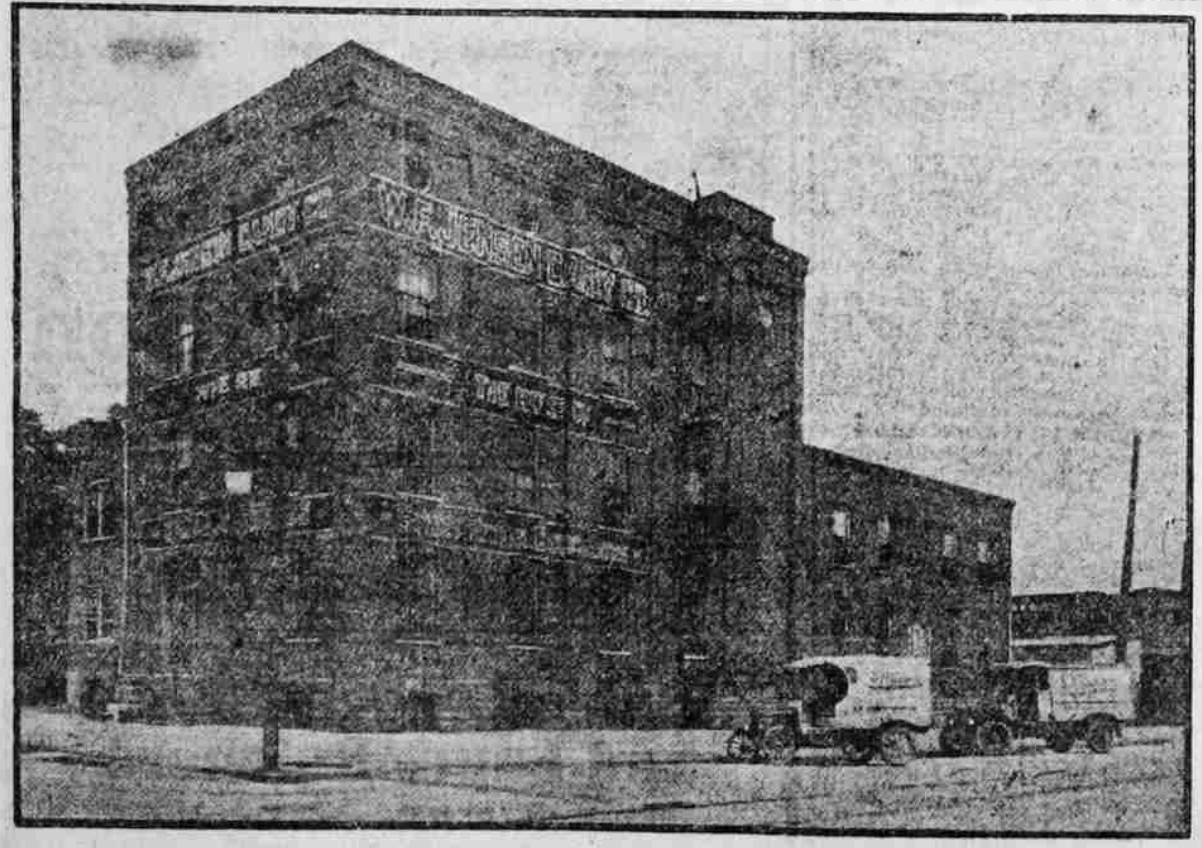
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